



Proposers' Conferences Schedule

- Wednesday, April 8, 2009 Gaithersburg MD
- Monday, April 13, 2009 Boston, MA
- Wednesday, April 15, 2009 Detroit, MI
- Friday, April 17, 2009 San Jose, CA

- No advance registration or fee required to attend
- Gaithersburg Conference will be webcast LIVE and will be archived for future viewing
- Proposers are not required to attend



Technology Innovation Program

*Innovating for
Critical National Needs
2009 TIP Proposers' Conference*

**National Institute of
Standards and Technology**
U.S. Department of Commerce



TIP Proposers' Conference ***Gaithersburg***

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Today's Program Gaithersburg

9:00 a.m.

- Introduction to TIP and Key Features
- 2009 Competition Overview

10:30 a.m. BREAK

10:45 a.m.

- Understanding the TIP Criteria
- Preparing and Submitting a TIP Proposal

11:30 a.m. Q & A

NIST's Mission ...



Gaithersburg, MD



Boulder, CO

To promote U.S. innovation and industrial competitiveness by advancing

**measurement science,
standards,
and technology**

in ways that enhance economic security and improve the quality of life for all Americans.

Technology Innovation Program: Part of NIST

Funding

- \$65 million for FY 2009, including management of ongoing TIP and Advanced Technology Program awards

TIP draws upon NIST scientific and technical expertise

- Help identify and select areas of critical national need for TIP funding
- Evaluate proposals

NIST benefits from collaborating with TIP

- Apply understanding of critical national needs to NIST research programs
- Enhance knowledge, skills, abilities through TIP program development



What is TIP?

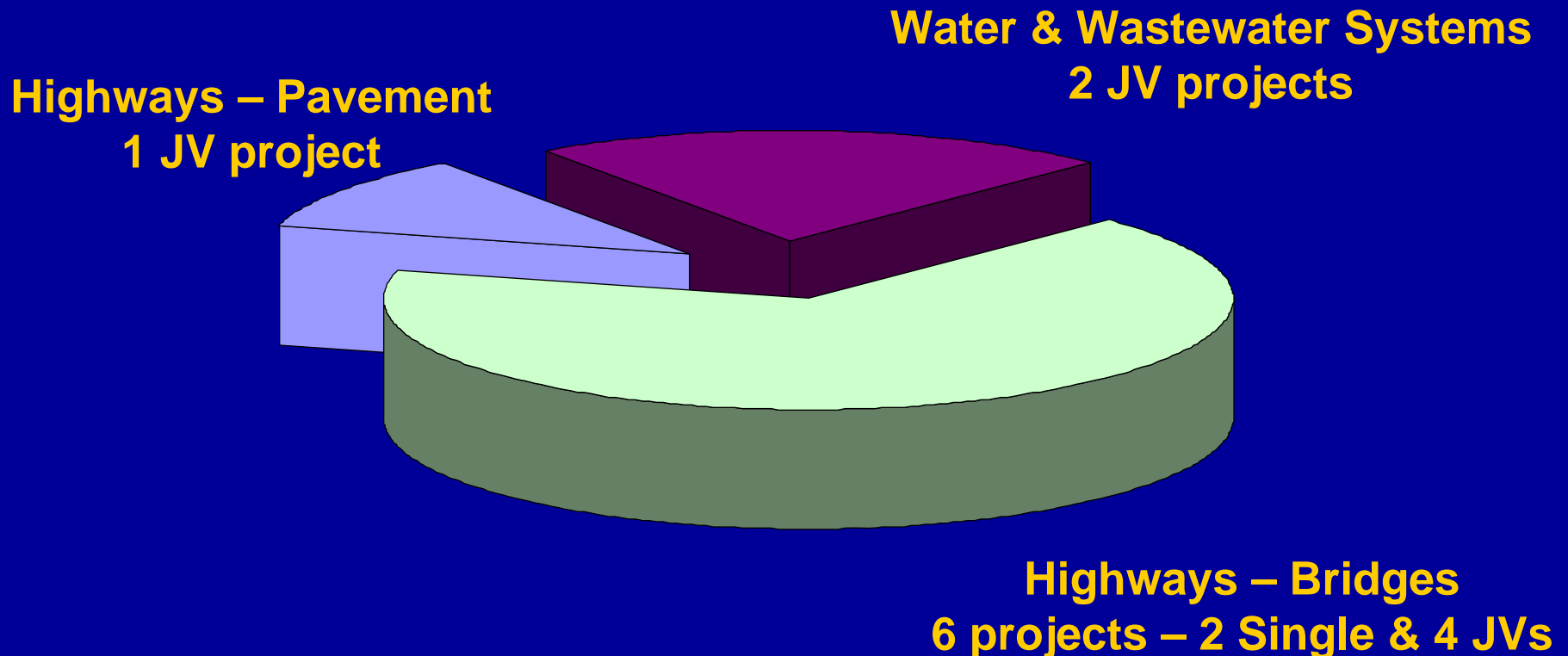
- TIP is a cost-shared, federal funding program that focuses on high-risk, high-reward research that is expected to transform the Nation's capacity to deal with major societal challenges that are not being addressed.

- Assist United States businesses and institutes of higher education or other organizations, such as national laboratories and nonprofit research institutes
- Support, promote, and accelerate innovation in the United States through high-risk, high-reward research
- In areas of *critical national need*

*America COMPETES Act, (PL 110-69)
August 9, 2007*

2008 Competition Awards Civil Infrastructure

**Advanced Sensing Technologies for the Infrastructure: Roads,
Highways, Bridges and Water Systems**





Key Features of TIP

- **Novel Purpose**
 - Address societal challenges not being addressed in areas of critical national need with benefits that extend significantly beyond proposers
- **Scientific & Technical Merit**
 - High-risk, high-reward research
- **Transformational Results**
 - Strong potential for advancing state-of-the-art and contributing to U.S. science and technology base



Key Features of TIP ***(cont'd)***

- **Recipients CAN be**
 - Small and medium-sized, U.S., for-profit businesses
 - Institutes of higher education
 - National laboratories (with the exception of NIST)
 - Nonprofit research institutes
 - Other organizations
- **Large companies (i.e., Fortune 1000 companies)**
 - MAY participate as a JV member and fully fund their participation, a contractor, or an informal collaborator
 - MAY NOT directly receive federal funds

Single Company Proposers

- Single Company – a small or medium-sized for-profit company doing a majority of its business in the U.S. and is either:
 - A U.S. owned company or
 - A U.S. subsidiary of a foreign parent
- **Funding limitations**
 - Up to \$3M federal funds for up to 3 years
 - May be used only for direct costs
 - Must be not greater than 50 percent of total project costs

Joint Venture Proposers

- **Joint Venture – A business arrangement that includes either:**
 - At least two separately owned small or medium-sized for-profit; or
 - At least one small or medium-sized for-profit company and one institute of higher education or other organization such as a national laboratory, governmental laboratory (not NIST) or nonprofit research institute.
- **Funding limitations**
 - Up to \$9M federal funds for project lengths up to 5 years
 - May be used only for direct costs
 - Must be not greater than 50 percent of total project costs

Either a small or medium-sized business or an institute of higher education may lead a joint venture project

What is a Critical National Need?

- An area that justifies government attention because the magnitude of the problem is large and the societal challenges that need to be overcome are not being addressed, but could be addressed through high-risk, high-reward research

What is a TIP *Societal Challenge*?

- A problem or issue (*not a solution or answer*) confronted by society that
 - when not addressed could negatively affect the overall function and quality of life of the nation, and as such justifies government attention
 - can be addressed through high-risk, high-reward research

When evaluating Societal Challenges and Critical National Needs, TIP

- Uses a critical national need identification & selection process to shape TIP competitions and collaborative programs
- Assesses a diversity of areas and challenges where transformative research could be expected to have large societal impacts
- Conducts an analysis of federal funding to determine unique TIP role(s) within a critical national need and associated societal challenges

- **TIP seeks input from a host of external stakeholders and organizations**
 - Government agencies and advisory bodies
 - Science and Technology Policy Institute
 - Industry organizations, leading researchers from academic institutions, and others
- **Call for White Papers on Critical National Needs**
 - Due May 11, 2009, and July 13, 2009
 - “A Guide for Preparing and Submitting White Papers on Areas of Critical National Need” – December 2008
 - Federal Register Notice

Current TIP Critical National Need and Interest Areas

Critical National Need Areas

- **Civil Infrastructure**
- **Manufacturing**

Interest Areas

- **Energy**
- **Green Technologies**
- **Healthcare**
- **Networks**
- **Water**

This is a list of Critical National Need and interest areas that TIP has identified to date. It is not exhaustive and others may be added in the future

TIP 2009 Competition

Area A: Civil Infrastructure

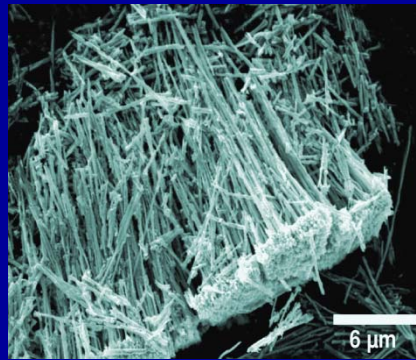


- Poor road conditions cost the U.S. \$54 billion a year in repairs and operating costs
- More than 27% of the nation's 600,000 bridges are rated structurally deficient or functionally obsolete
- Water main leakages and breaks consume 6 billion gallons of treated water each day

Failure to reverse a trend of increasing highway infrastructure deterioration will lead to reductions in national and economic security, lower worker productivity, and an overall reduction in the quality of life

TIP 2009 Competition

Area B: Manufacturing



- Manufacturing is a significant part of the U.S. economy
 - In 2007, represented 11.7% of U.S. GDP, 10.1% of U.S. employment
- Manufacturing sector struggling
 - In 2002, the U.S. manufacturing sector represented 5th largest economy in the world, by 2007 had fallen to 8th largest
 - Institute for Supply Management New Orders Index remains negative for 15 consecutive months

Failure to invest in technology advances that can be implemented by the manufacturing sector will result in continued reductions in economic security, and an overall reduction in the quality of life



2009 TIP Competition Important Dates

- The Competition is currently **OPEN**
- Paper submission or electronic submission via Grants.gov
- The **deadline** is:
 - **Tuesday, June 23, 2009**
 - All proposals must be received by TIP by 3:00 PM Eastern time (regardless of submission method) **WITHOUT EXCEPTION**

*To ensure timely receipt, don't wait to submit until
deadline day!*



2009 Competition Area A: Civil Infrastructure Structural Integrity

2009 Competition Area A: Civil Infrastructure

- **Critical National Need**
 - Civil Infrastructure
- **Societal Challenge**
 - Managing the structural integrity of the United States' infrastructure
 - The absence of cost-effective means for establishing accurate assessments of the integrity and condition of civil infrastructure elements and for providing long-lived repairs to deteriorating infrastructure
- **TIP's Response for 2009**
 - “Advanced Sensing Technologies and Advanced Repair Materials for the Infrastructure: Water Systems, Dams, Levees, Bridges, Roads, and Highways”
 - Two elements:
 - Inspection and/or Monitoring Technologies
 - Repair/Retrofit Materials and Application Technologies

2009 Competition Area A: Civil Infrastructure (cont'd)

What's Different for 2009?

- **Expanded emphasis**
 - Dams, levees and navigation lock structures, in addition to water mains and wastewater collection systems, bridges, roads, and highways
- **Two elements**
 - Element 1: Inspection and/or monitoring technologies (sole focus in 2008)
 - Element 2: Repair/retrofit materials and application technologies (new for 2009)



2009 Competition Area A: Civil Infrastructure Scope

What TIP is Seeking

Element 1: Inspection and/or Monitoring Technologies

Advancement beyond the current practice and state-of-the-art of sensing technologies and repair/retrofit technologies to assess the structural integrity and/or deterioration processes of water mains, wastewater collection systems, dams, levees, navigation lock structures, bridges, roads, and highways

- More accurate
- Easier to use
- More economically feasible

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Innovations are being sought

Element 1: Inspection and/or Monitoring Technologies

- **Create and validate new, advanced, robust, network capable, nondestructive evaluation and test sensing systems, or system components**
 - Cost effectively and quantitatively inspect and evaluate the structural integrity of civil infrastructure elements of water and wastewater mains, dams, levees, navigation lock structures, bridges, roads and highways
- **Targeted system should be capable of, but not limited to**
 - Detection of corrosion, cracking, delamination, scour erosion, and other relevant modes of failure of critical infrastructure elements and the materials of which they are made

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Innovations are being sought (cont'd)

Element 1: Inspection and/or Monitoring Technologies

- **Solutions are needed for improved inspection systems**
 - Water and wastewater mains, dams, levees, navigation lock structures, bridges, roads, and highways
 - Provide real-time understanding of the integrity and service life through the use of portable, mobile or remote sensing capabilities
- **All aspects of a system can be considered**
 - Advanced, cost effective
 - Networked, either fixed or mobile
 - Easily deployable, self powered, and self monitoring
 - All system components, hardware and software
- **Systems may, or may not, need to be submersible to assess underwater integrity issues**

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Eligible projects (examples)

Element 1: Inspection and/or Monitoring Technologies

- Systems that provide forewarning of degraded structural integrity for prioritization of repair schedules
- Systems that provide new and advanced methodologies for the detection of fluid leaks from water piping systems
- Inspection systems for structural components located below a water surface in part, or in whole, and susceptible to failure caused by scour, impact, degradation and/or some other subsurface mode of failure
- Single novel components of a system solution that include a validation of the component in a system setting

Proposals should include validation of the effectiveness of the new technology in actual environmental use conditions with potential end user(s) of the technology

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Ineligible projects

Element 1: Inspection and/or Monitoring Technologies

- Advancements in a system component without a prototype demonstrating that the component is functional within a system solution
- Straightforward improvements to existing components or materials without the potential for a transformational increase in performance to the technical requirements
- Integration projects using only existing state-of-the-art components or materials

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Ineligible projects (cont'd)

Element 1: Inspection and/or Monitoring Technologies

- Software development that is predominantly straight-forward, routine data gathering using applications of standard software development practices
- Other ineligible projects, as described in Chapter 1, Section D.1. in the TIP Proposal Preparation Kit



2009 Competition Area A: Civil Infrastructure Scope

What TIP is Seeking

Element 2: Repair/Retrofit Materials and Application Technologies

- **Economical, advanced repair/retrofit technologies for existing civil infrastructure elements**
 - Water mains, wastewater collection systems, dams, levees, navigation lock structures, bridges, roads, and highways
- **Transformative research to significantly extend the lifetimes of repairs, lower the costs of repairs, and provide repair technologies suitable for a wide range of conditions**

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Innovations are being sought

Element 2: Repair/Retrofit Materials and Application Technologies

- Create novel technologies for repair or retrofit of existing civil infrastructure elements
 - Consists of two parts: a novel material and the application or deployment system for installing or placing the novel material
- Provide much longer-lived repairs than current repair materials and/or greater performance characteristics than current repair/retrofit methods and/or the original construction

Development of a new material, or a novel combination of materials that results in a transformational solution for cost-effective repair/retrofit that includes a novel technology for achieving the repair or retrofit will be considered as highly competitive

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Eligible projects

Element 2: Repair/Retrofit Materials and Application Technologies

- The combination of a novel material, or a novel combination of materials, combined with a novel application or installation technology
- A novel application technology that incorporates:
 - An existing material, or combination of materials, from material domains outside those normally used within civil infrastructure
 - or
 - That incorporates a material or combination of materials, from a domain of materials normally used within civil infrastructure

Note: To be considered highly competitive, there must be a transformational expansion of applicability of the materials

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Eligible projects (cont'd)

Element 2: Repair/Retrofit Materials and Application Technologies

- A novel material, or a combination of materials, that can be applied with existing application technologies, or that requires minor adjustments to existing application technologies

Proposals should include validation of the effectiveness of the new technology in actual environmental conditions with potential end user(s) of the technology

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Ineligible projects

Element 2: Repair/Retrofit Materials and Application Technologies

- Novel materials, or combinations of materials, that apply only to new construction or primarily to new construction
- A novel material, or novel combination of materials, for which there is not a deployment technology and no deployment technology approach is included in the proposed research
- Training or training systems for repair/retrofit installation of novel materials or of current materials

2009 Competition Area A: Civil Infrastructure Scope (cont'd)

Ineligible projects (cont'd)

Element 2: Repair/Retrofit Materials and Application Technologies

- Novel systems to deploy repair/retrofit materials, where the materials are both not novel and do not have a history of being long-lived repair solutions
- Novel repair parts or assemblies that do not incorporate a novel material, for example: a new type of retrofit stirrup or bracing made from current, conventional materials or combinations of materials
- Other ineligible projects, as described in Chapter 1, Section D.1. in the TIP Proposal Preparation Kit



***2009 Competition Area B:
Accelerating the Incorporation of Materials
Advances into Manufacturing Processes***

2009 Competition Area B: Manufacturing

- **Critical National Need**
 - Manufacturing
- **Societal Challenge**
 - Providing manufacturers and end users
 - Improved access to adequate quantities of advanced materials at competitive costs
 - That allow evaluation and utilization of these materials in innovative ways
- **TIP Response**
 - “Accelerating the Incorporation of Materials Advances into Manufacturing Processes”
 - Two elements:
 - Process scale-up, integration, and design of advanced materials
 - Predictive modeling for advanced materials and materials processing

2009 Competition Area B: Manufacturing Scope

What TIP is Seeking

- Manufacturing solutions that have the potential to create significant performance improvements in new products by accelerating the utilization of an advanced material's new functionality
- Limited to three classes of materials considered most critical to emerging or other potential growth areas for manufacturing
 - Nanomaterials
 - Superalloys, alloys and smart materials
 - Composites

All proposals must address how the outcomes of the research will enable manufacturers to produce advanced materials faster, better and cheaper, as well as enable the new uses for the advanced materials

2009 Competition Area B:

Manufacturing Scope (cont'd)

Proposed solutions must map into one or more cells for the proposal to be eligible for funding

Technological Needs		Nanomaterials	Superalloys, Alloys & Smart Materials	Composites
Materials Processing	Scale-up from Laboratory Quantities / Controls			✓*
	Incorporate into New Uses / Maintain Functionality			
Predictive Modeling Tools	Rules / Understand Why It Does What It Does	✓*		
	Process Modeling / Design & Product Design Tools	✓*		

* example only

2009 Competition Area B: Manufacturing Scope (cont'd)

Innovations are being sought

Element 1: Process scale-up, integration, and design of advanced materials

- Increase to commercial scale the quantity and quality of available advanced materials
- Help incorporate advanced materials into new, revolutionary products based on the material's properties
- Scale-up processes that are next generation or an entirely new process
- New instrumentation and measurement capabilities
 - To measure real time process parameters
 - To ensure and/or verify materials are being correctly incorporated into manufactured products while maintaining their revolutionary functions

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals

Element 1: Process scale-up, integration, and design for advanced materials

- A single process to achieve the goals of the scale-up, or ones that consist of one or more processes integrated together into a coherent solution; or
- Scale-up of materials processes to manufacture and apply coatings that are within the three eligible material types (nanomaterials; superalloys, alloys and smart materials; and composites); or
- Scale-up of materials processes for healthcare applications (e.g. imaging)

Proposals will be considered more competitive if they: 1) include validation methodologies by or with processors or end users; and/or 2) address sustainability issues.

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals (cont'd)

Element 1: Process scale-up, integration, and design of advanced materials

- Eligible proposals must address **all** of the following issues:
 - Address one or more of the eligible materials areas:
 - nanomaterials;
 - superalloys, alloys, and smart materials;
 - and/or composites
 - Quantify the baseline processing capability
 - Describe how the results of the process scale-up could lead to new products and manufacturing process capabilities
 - Quantification and qualification of the estimated output of the final project results

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals (cont'd)

Element 1: Process scale-up for advanced materials

- Eligible proposals must address **both** of the following issues:
 - Scale-up of the quantities produced during the project must be targeted to increase by a factor of 1,000 fold or more (unit quantity per unit time) as compared to the baseline
 - A detailed scientific rationale and identification of challenges to accomplish scale-up of the processes

2009 Competition Area B: Manufacturing Scope (cont'd)

Ineligible proposals

Element 1: Process scale-up, integration, and design of advanced materials

- Have the primary focus on the following materials
 - Materials derived from a biological source; or
 - A pure ceramic, glass (including metallic glass), or polymer; or
 - Primarily an electronic or photonic material
- Focus primarily on the application of material coatings
- Other ineligible projects, as described in Chapter 1, Section D.1. in the TIP Proposal Preparation Kit

2009 Competition Area B: Manufacturing Scope (cont'd)

Innovations are being sought

Element 2: Predictive modeling for advanced materials and materials processing

- New tools to enable researchers to use constitutive relations and rules (with validation) concerning the underlying behavior of materials (understanding structure vs. function) and the changes to behavior due to manufacturing processes
- Enable a better and quicker understanding of why materials do what they do
- Significantly improve capabilities within the manufacturing communities to quickly incorporate advanced materials breakthroughs into revolutionary products based on new materials functionality

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals

Element 2: Predictive modeling for advanced materials and materials processing

- Eligible proposals must address **all** of the following issues:
 - Address one or more of the eligible materials areas:
 - nanomaterials;
 - superalloys, alloys, and smart materials;
 - and/or composites
 - Quantify the baseline modeling capability; and
 - Describe how the results of the proposed modeling capabilities could lead to new products and manufacturing process capabilities

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals

Element 2: Predictive modeling for advanced materials and materials processing

- Proposals must address ***one or both*** of the following issues:
 - Develop constitutive relationships and rules that describe the behavior and the process of the materials at a level that is useful for describing laboratory results as well as for developing a greater understanding of the materials for end users; and/or
 - Develop or use the constitutive relationships and rules to develop process design tools for manufacturing processes based on these advanced materials.

2009 Competition Area B: Manufacturing Scope (cont'd)

Eligible proposals (cont'd)

Element 2: Predictive modeling for advanced materials and materials processing

- Proposals that include the following will be considered more competitive
 - Collaboration by or with those who manufacture the advanced materials, in order to validate their models; and/or
 - How users will specifically benefit from the acceleration and implementation of the proposed models in support of materials reliability (i.e. final properties or mechanical performance) and materials behavior before and after processing
- Proposals that do not include validation of models will be considered less competitive

2009 Competition Area B: Manufacturing Scope (cont'd)

Ineligible proposals

Element 2: Predictive modeling for advanced materials and materials processing

- Have the primary focus on the following materials
 - Materials derived from a biological source; or
 - A pure ceramic, glass (including metallic glass), or polymer; or
 - Primarily an electronic or photonic material
- Focus primarily on the application of material coatings
- Other ineligible projects, as described in Chapter 1, Section D.1. in the TIP Proposal Preparation Kit



2009 Competition Area B: Manufacturing Scope (cont'd)

Ineligible proposals

All Manufacturing Proposals

- Projects whose principal focus is on discovery of new materials
- Efforts related to the physical extraction of raw materials
- Straightforward improvements to existing processes or materials without the potential for a transformational increase in performance to the technical requirements

2009 Competition Area B: Manufacturing Scope (cont'd)

Ineligible proposals (cont'd)

All Manufacturing Proposals

- Integration projects using only existing state-of-the-art processes, models or materials
- Software development that is predominantly straightforward, routine data gathering using applications of standard software development practices
- Other ineligible projects, as described in Chapter 1, Section D.1. in the TIP Proposal Preparation Kit

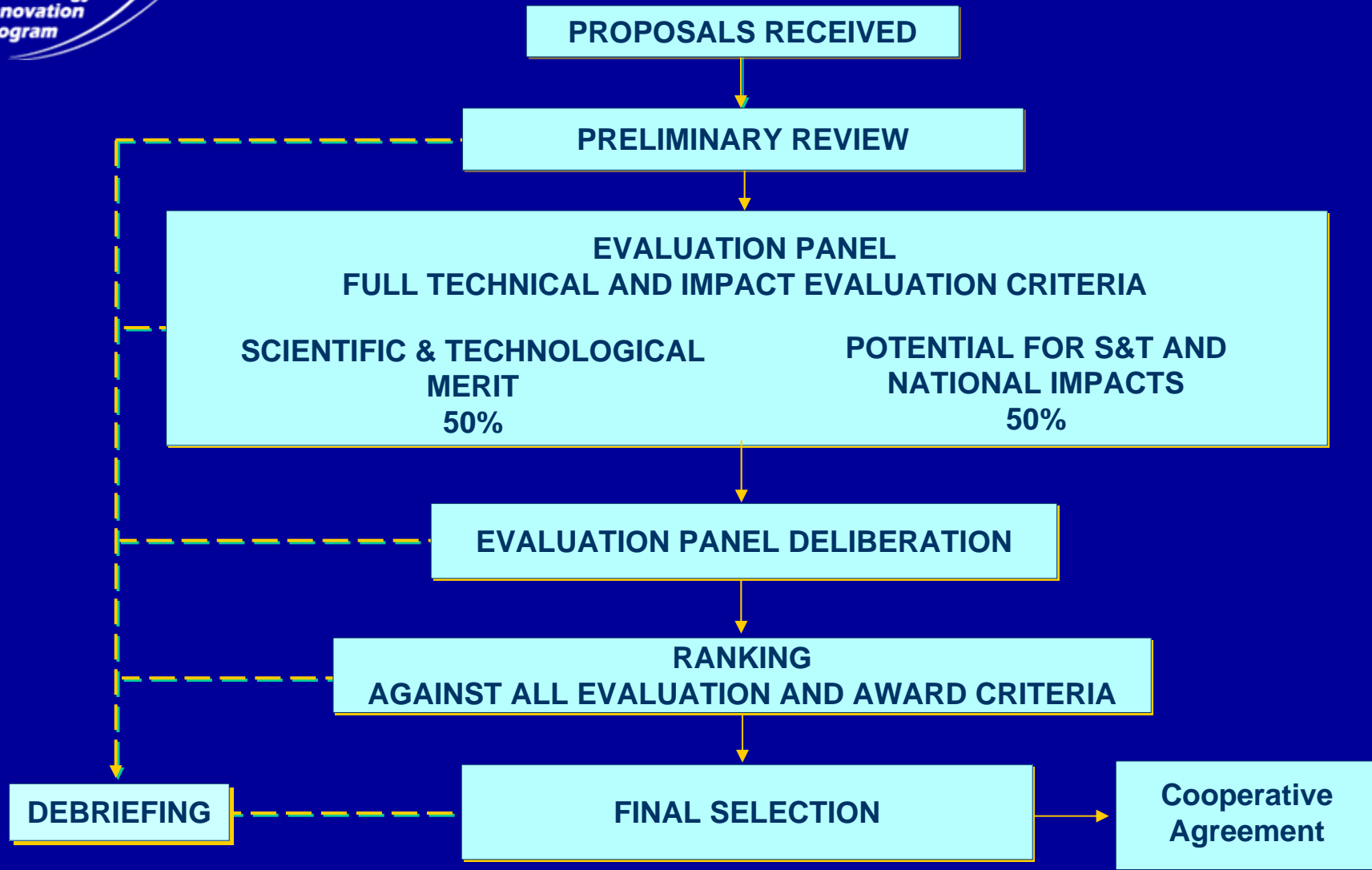


Break



Understanding the TIP Criteria

Project Selection Process





TIP Award and Evaluation Criteria

- **Proposals are selected for funding based on:**
 - TIP Award Criteria (15 C.F.R. §296.22), and
 - TIP Evaluation Criteria (15 C.F.R. § 296.21)
- **No proposal will be funded unless TIP determines:**
 - It has scientific and technical merit
 - The proposed research has strong potential for addressing a societal challenge within the TIP-identified area(s) of Critical National Need

Peer Review is the foundation for all proposal evaluations and decisions

- **TIP evaluates novelty from two perspectives**
 - Novelty of the research (technology) results/outcomes
 - Novelty of the research approach
- **Substantial involvement within a Joint Venture**
 - Required of:
 - At least **two** separately owned eligible companies, or
 - At least **one** eligible company and **one** institution of higher education or other organization
 - May be demonstrated in a variety of ways, e.g.
 - Documented research contributions
 - Scientific/intellectual role in guiding the R&D

TIP Award Criteria: The First Three

Three Award Criteria explain the need for TIP financial support

1. Why is TIP support necessary?
2. Efforts to secure alternative funding
3. Novelty of the proposed research (technology)
results/outcomes

*Failure to adequately address all criteria will
prevent a proposal from moving forward*



Award Criteria: Why is TIP Support Necessary?

- Why does the specific project need taxpayer funds?
- How will the Nation benefit?
- How will the specific project address the competition's societal challenge(s)?
- What will happen with and without TIP funding?
 - Consequences to the research?
 - Impact on the societal challenge?
 - What evidence exists that the research will not be conducted within a reasonable time period without TIP funding?

Award Criteria: Efforts to Secure Alternative Funding?

- Each proposer, single or each JV member, must have adequately sought alternative funds but such funds are not available or not available in a reasonable time period
 - Internal funding?
 - External private sources?
 - Other government sources?
- Required documentation **must** be provided

Proposers must demonstrate that reasonable and thorough attempts have been made to secure funding from other sources



Award Criteria:

Novelty of Proposed Research

Results/Outcomes

- Discuss and provide specific details about ...
 - How the proposed research (technology) is novel relative to similar research results others have developed, commercialized, marketed, distributed, or sold
 - Why the project has the potential to more fully address the societal challenge(s) where others do not
 - How the research (technology) results are transformational
- Science-based and performance-based detail (metrics) are critical to making a competitive case

Research (technology) results/outcomes from TIP funded research must be novel!

Award Criteria: ***Novelty of Proposed Research*** ***Results/Outcomes* (cont'd)**

Proposed Solution: The New State of the Art

Project objectives?

Quantified targets?

How the project may more fully address the challenge?

Comparison to competing solutions?



**TIP
Innovation**

Baseline: Today's State of the Art

Within the industry at large?

What others are currently developing?

Within the team?

TIP Award Criteria: The Remaining Three

The remaining three Award Criteria

- Scientific and technical merit and may result in intellectual property vesting in a U.S. entity
- Strong potential to advance the state-of-the-art and contribute to the U.S. science and technology knowledge base
- Strong potential to address areas of critical national need
 - Transforming the Nation's capacity to deal with major societal challenges
 - Generate substantial benefits to the Nation that extend significantly beyond the proposer

*These are expanded upon and evaluated as part of the
TIP Evaluation Criteria*

- **Two Evaluation Criteria**
 - 1) Scientific and Technical (S&T) Merit (50%)
 - 2) Potential for S&T and National Impacts (50%)
- **Subject to multidisciplinary peer review**

1) Scientific and Technical Merit (50%)

The proposer(s) adequately addresses the scientific and technical merit and how the research may result in intellectual property vesting in a United States entity ...

1) Scientific and Technical (S&T) Merit (50%) **(cont'd)**

Specifically ...

- Novelty of the proposed research approach
- Potential to address technical needs associated with a major societal challenge
- High-risk, high-reward research
- Qualifications of the proposed research team
- A scientifically sound technical plan with tasks, milestones, timeline, decision points and alternate strategies

Societal Challenge as the Driver of Technical Planning

What is Needed to Overcome
the Societal Challenge?



What is Needed for Technical Success?

S&T Merit: Novelty of the Research Approach

The proposed research approach must be novel!

- Ask yourself, “Why is the research project novel?”
 - Novel technical approach?
 - Novel integration?
- Is the research transformational, not just incremental or predictable?
- How is the research innovative relative to alternative approaches being pursued?
 - By others inside or outside of the team
 - Domestic or foreign competitors
 - If others have tried and failed, why will you succeed?

Discuss state-of-the-art knowledge and ongoing work by others

S&T Merit: Addresses Technical Needs

The proposed research must have the potential to address the technical needs associated with the societal challenge(s)

- How does the research address a solution to the societal challenge(s)?
- What are the expected outcomes of a successful research plan?
- What are the measureable success criteria?
 - Link them to key requirements and performance metrics

Proposals that are predominately basic science or best level of effort without measurable targets are less competitive

S&T Merit: High-Risk, High-Reward Research

***High-risk, high-reward research is core to
TIP's purpose!***

Does your idea...

- ✓ Enable significant advances in addressing the solicitation's societal challenge(s)?
- ✓ Have potential for transformational results?
- ✓ Have far- or wide-ranging implications?
- ✓ Embody too novel or spans too diverse a range of disciplines?



***High-Risk,
High-Reward
R&D***

S&T Merit: High-Risk, High-Reward Research

A competitive proposal will address ...

- The scientific risks and technical barriers
- How the results have the potential for far- or wide-ranging implications if successful
- How the work, if successful, will dramatically transform the future direction and state of the technology
- How the team seeks to overcome extremely difficult scientific or technical challenges
- The leveraged technical and scientific benefits beyond the initial applications

S&T Merit: Qualifications of the Research Team

Describe information about key technical team members that will work on the project

- Multiple disciplines required by the plan
- Quality and appropriateness of the technical team
- Level of effort/time for the key personnel allocated to the project
- Brief highlight of experience and qualifications of key personnel, including contractors
- If key staff need to be hired, the qualifications needed and the plan to acquire

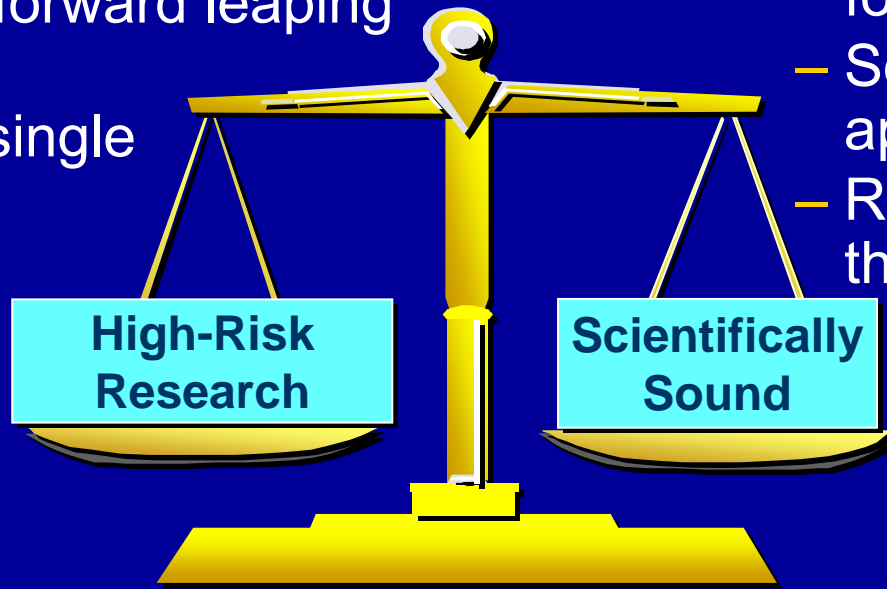
High-Risk Research and Scientific Soundness

High-Risk Research

- Extremely difficult scientific risks or technical challenges
- Possibility technical challenges may not be overcome
- Path changing, forward leaping technology
- Includes either single innovations or integration of disparate technologies, or both

Soundness

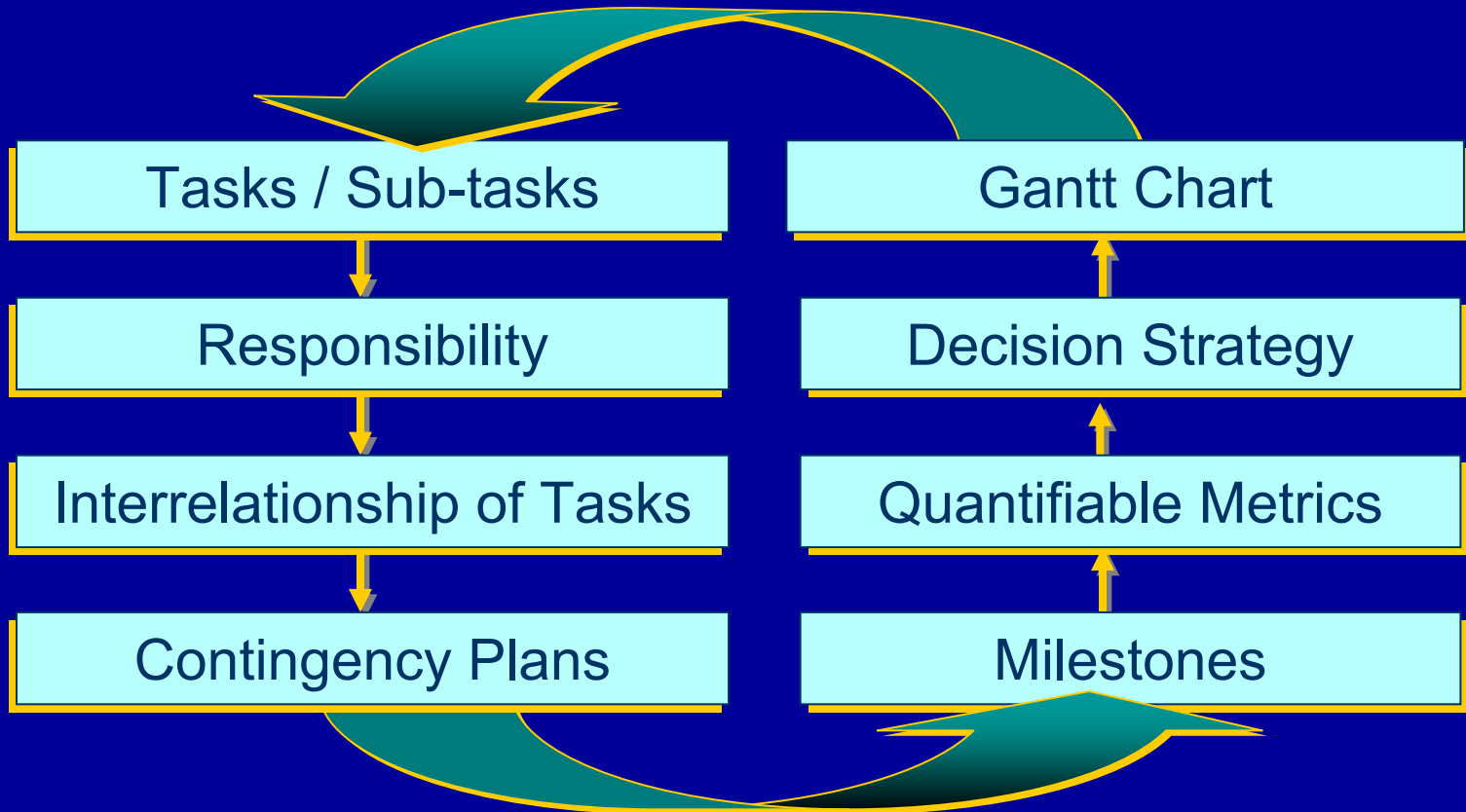
- Approach and metrics to manage project are based on
 - Sound scientific foundation
 - Sound engineering approach
 - R&D evidence and theoretical thinking



Your TIP proposal should balance both!

S&T Merit: A Sound, Detailed R&D Plan

How will you achieve your goals?



A competitive proposal must address all aspects

S&T Merit: Facilities, Equipment and Resources

Adequacy of facilities, equipment and resources

- Existing vs. needed
- Timeline for meeting needs
- Link major purchases to the R&D plan
- Equipment or resources collaboration agreements
- Contractors for key expertise, facilities, goods or services

Projects may include contractors to obtain key expertise, access to facilities, or specialized goods and services

- What does each contractor bring to the project?
 - Who? What? Why?
- What is the relationship of the contractor's work to the technical plan?
- How will the contractors' progress be monitored and redirected?

The proposer or JV members should direct and carry out most of the key high-risk and high-innovation tasks

IF the project plan includes work performed by a foreign-owned company or at a non-U.S. site, explain and justify

- For foreign-owned company participation, complete NIST-1022G
- For R&D at non-U.S. sites, complete NIST-1022H

2) Potential for S&T and National Impacts (50%)

- **Establishes that the proposed research has strong potential**
 - For advancing the state-of-the-art and contributing significantly to the United States science and technology base, and
 - To address areas of Critical National Need through transforming the Nation's capacity to deal with a major societal challenge(s) that is not currently being addressed
 - To generate substantial benefits to the Nation that extend beyond the direct return to the proposer

Potential for Impact: Advancing the State-of-the-Art

TIP Philosophy

*Successfully accomplishing the proposed research and surmounting the technical challenges should result in a **transformational** change in the future direction and state of the technology.*

This “path change” should be a major leap forward, advancing the state-of-the-art significantly.

Supported by three key elements

- What might advancing the state-of-the-art look like in terms of impact?
- What are the potential pathways for the impacts?
- How might the impacts cross disciplines?

Potential for Impact: Advancing the State-of-the-Art (cont'd)

Explain

- How does the proposal advance the state-of-the-art?
- How will the research results and contributions to the U.S. knowledge base diffuse beyond the team while maintaining ownership?
- How will the dissemination strategy reach across disciplines that could benefit from the results?

Potential for Impact: Transforming the Nation's Capacity

***Three elements need to be addressed adequately
to be competitive***

1. The analysis of the potential magnitude of the transformation
2. The plan for how and when results will have positive effects
3. The capacity and commitment of all project participants to enable or advance the transformation

Potential for Impact: Transforming the Nation's Capacity (cont'd)

1. The potential magnitude of transformational results

- How will the Nation's capabilities to address a societal challenge be different once the results of this research are put to use?
- What is the magnitude or difference that the technology will make? Quantify!
- What are the specific differences TIP funding makes in realizing the societal benefits of the proposed project?
- How could the results extend beyond the initial targeted societal challenge(s) and proposers?

Potential for Impact: Transforming the Nation's Capacity (cont'd)

2. How and when the ensuing transformational results will unfold

- How will the research results (technology) be put to use?
- How will the research results (technology) move from the research team to those who will use it to address the societal challenge?
- What strategies will be employed inside or out of the proposing team to realize the transformation?
 - E.g. organizations; potential first users; strategies to overcome barriers; timeline for reaching first users and the broader community of potential users

3. The capacity and commitment of each project participant

- **Organizational Commitment**
 - To perform the proposed research
 - To enable or advance the transformation
- **Organizational Information**
 - Financial, organizational, employment, ownership
- **Current and Past Federal Awards**
 - Throughout the proposers' entire organization

Avoid These Proposal Weaknesses

- **Outside the TIP mission**
 - Low-risk (e.g., product development) or unbounded research
 - Lacks demonstrated need for TIP support
 - Reasonable and thorough efforts for other funding have not been adequately pursued
- **Insufficient detail and unsupported assertions**
 - What is novel and why
 - How the R&D is high-risk, high-reward and transformational
 - Completeness of the R&D plan, team, metrics, and budget spells success
 - How objectives will be accomplished



Preparing and Submitting a TIP Proposal



Discussion Points

- Proposal Preparation Resources
- Two Ways to Propose
- Joint Venture Particulars
- Intellectual Property Provisions
- Foreign Company Participation
- Assembling a TIP Proposal
- Page Limit
- Items not Included in Page Limit
- Budget Preparation
- Costs and Cost Sharing
- Types of Costs
- Administrative Requirements and Cost Principles
- Information Requests During Proposal Review
- Accounting System Certification and Audits
- Human and Animal Subjects
- Proposal Submission Process
- Key Contacts
- 2009 TIP Competition Important Dates

Proposal Preparation Resources

Resources

- 2009 TIP Proposal Preparation Kit
- Proposal Submission Requirements Checklist
- “Accelerating the Incorporation of Materials Advances into Manufacturing Processes” white paper
- “Advanced Sensing Technologies and Advanced Repair Materials for Infrastructure: Water Systems, Dams, Levees, Bridges, Roads, and Highways” white paper
- Guidelines and Documentation Requirements for Research Involving Human and Animal Subjects



Proposal Preparation Resources (cont'd)

TIP Web Site

- <http://www.nist.gov/tip>
- FY 2009 Competition Page
(http://www.nist.gov/tip/comp_09/comp09_home.html)
- Helpful Resources Page
(www.nist.gov/tip/helpful.html)



There are 2 ways to Develop a TIP Project Proposal

- Single company applicant
- Joint venture (JV)

Forming a Joint Venture

- **At least two** JV members must be substantially involved in the research
- A joint venture agreement is required to issue an award
 - Viable draft as part of the proposal
 - Final signed agreement in place **PRIOR** to award
- **No separate corporate entity needs to be created**
- JV lead is responsible for all reporting requirements

“Joint Venture” for TIP means a teaming arrangement for the duration of the project

Intellectual Property Provisions

- **Single Company awards**
 - Bayh-Dole Act applies, the entity that invents owns the invention (with some unique exceptions)
- **Joint Venture awards**
 - Ownership may vest in any JV participant as agreed by the JV members

Government reserves a nonexclusive, nontransferable, irrevocable paid up license for governmental use in all cases

Foreign-Owned Company Participation

- U.S.-incorporated company with a parent company incorporated in another country may participate if in the economic interest of the U.S.
- Home country of parent must afford U.S. companies:
 - Comparable opportunities to participate in government-funded programs similar to TIP
 - Comparable local investment opportunities
 - Adequate and effective protection of U.S.-owned intellectual property rights



Foreign-Owned Company Participation (cont'd)

- If a foreign-owned company, must submit NIST-1022G, Foreign-Owned Company Questionnaire (Exhibit 10 in the TIP Proposal Preparation Kit) as part of your proposal
 - Separate form required for each foreign-owned company in the project, except contractors

Assembling a TIP Proposal

Proposal Assembly and Presentation Order

- SF424 (R&R) - 2 pages
- Research and Related Other Project Information
- 1022 Family of Forms
- Executive Summary
- Project Narrative
- Bibliography and Technical References
- Table of Abbreviations
- Table 3 & Table 4
- Letters
- Human Subjects information (if applicable)

Assembling a TIP Proposal ***(cont'd)***

1022 Family of Forms

- NIST-1022, Main Form
- NIST-1022A, Other Joint Venture Members
- NIST-1022B, Contractors
- NIST-1022C, Budget Narrative
- NIST-1022D, Third Party In-Kind Contributions
- NIST-1022E, Estimated Multi-Year Budget - Single Company
- NIST-1022F, Estimated Multi-Year Budget - Joint Venture
- NIST-1022G, Foreign-Owned Company Questionnaire
- NIST-1022H, R &D Work Performed Outside the United States by the Recipient or Contractor Questionnaire

Project Narrative Format

- **Page Limit**
 - Single company: 30 pages maximum
 - Joint venture: 40 pages maximum
- **Font size no less than 12 point**
- **Figures and diagrams must be readable**

Not Included in Page Limitations

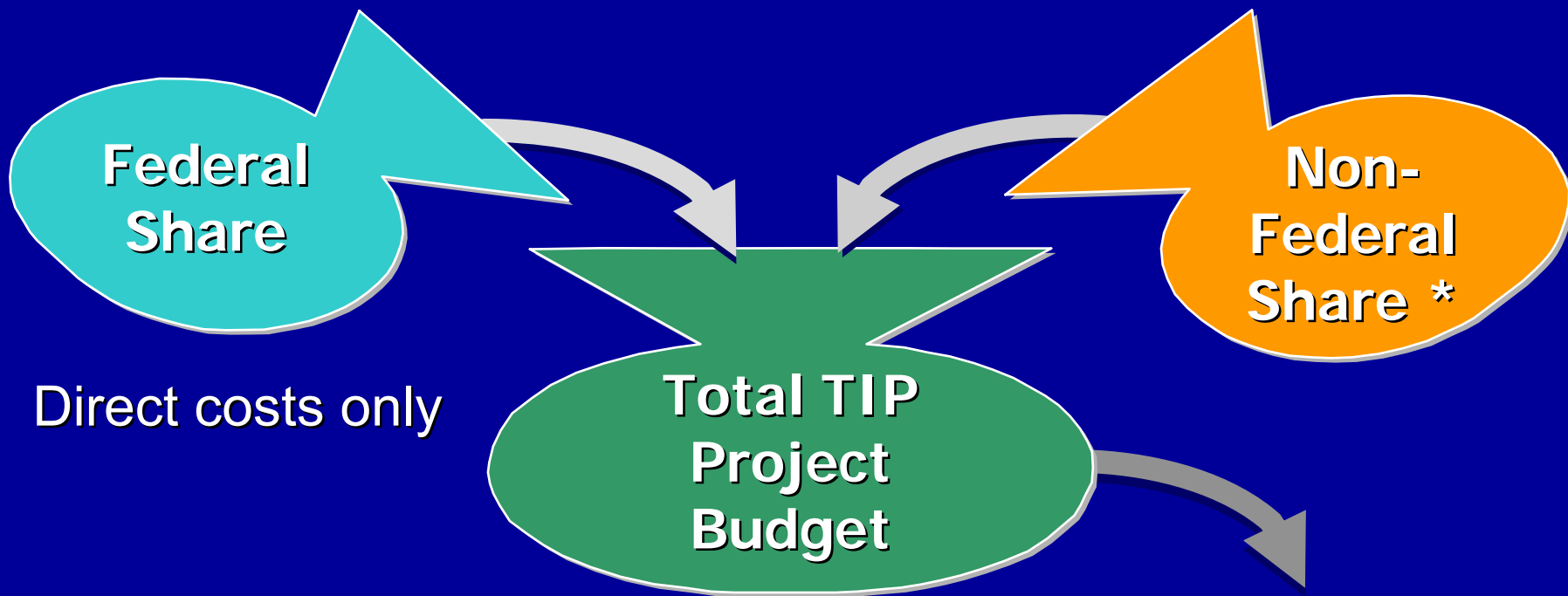
- Table 3 – Financial, Employment and Ownership Information
- Table 4 – Federal Awards Received by Company/Organization
- Required Letters
 - Commitment
 - Funding Support (Year 1)
 - Efforts to Secure External Funding
- Forms/budgets
- Bibliography/abbreviations/executive summary

- First, create a detailed budget narrative (NIST-1022C)
- Then, generate estimated Multi-Year Budget
 - NIST-1022E (Single Companies)
 - NIST-1022F (Joint Ventures)
- If needed, also complete Third Party In-Kind Contributions (NIST-1022D)

Budget: Costs and Cost Sharing

- Total project costs include federal and non-federal costs (cost share)
 - Account for all costs on a “project year” basis
- Two categories of project costs
 - Direct costs
 - Indirect costs
- TIP federal funds can only be used for direct costs

Budget: Federal and Non-Federal Funds



* Cost Sharing or matching means that portion of project or program costs not borne by the Federal Government and officially part of the award

Project Payments
in accordance
with approved
cost sharing ratio

Budget: Non-Federal Cost Share

All awards require at least 50% cost share contribution

- **Cash contributions**
 - Proposer/JV member contributions are always treated as “**CASH**”
 - Any nonfederal source (except contractors)
 - Proposer, JV member, state and local government, companies, nonprofits, etc.
- **Third party in-kind contributions**
 - Any nonfederal source (except contractors) outside the proposer/JV team
 - Staff, equipment, research tools, software, supplies, etc.
 - Refer to 15 CFR Part 14.23
 - Use NIST-1022D

Costs that can be identified specifically with a particular cost objective, including ...

- Personnel
- Travel
- Equipment
- Materials/supplies
- Contracts
- Other

NIST reserves the right to limit both the number of students and salaries on a particular project

Budget: Indirect/Overhead Costs

Costs that cannot be readily identified with a single cost objective but identified with common or joint objectives, including ...

- Salaries / expenses of executive officers
- Personnel administration
- Accounting
- Fringe benefits
- Office rent
- Maintenance
- Library expenses
- Office supplies
- General purpose office equipment, computers, printers, copiers, etc.

Indirect costs must be part of an approved indirect cost rate

- If you already have other Federal financial assistance awards, you probably have one in place – apply to your proposal costing for TIP
- If not, you will prepare and file a proposal for indirect rate approval with DOC after an award is made

How to account for fringe benefits?

- Dictated by your approved accounting system and established indirect cost rate
 - May be considered as either direct or indirect
- If fringe is a direct cost, include as part of “Other direct” category in budget

Administrative Requirements and Cost Principles

- **Administrative Requirements**
 - 15 CFR Part 14
- **Cost Principles**
 - For-profit companies: 48 CFR Part 31
 - Universities: 2 CFR Subtitle A, Chapter II, Part 220 (OMB Circular A-21)
 - Non-profits: 2 CFR Subtitle A, Chapter II, Part 230 (OMB Circular A-122)
 - State and local governments: 2 CFR Subtitle A, Chapter II, Part 225 (OMB Circular A-87)
 - Hospitals: 45 CFR Part 74, Appendix E
- **See www.nist.gov/tip/helpful.html**

During Proposal Evaluation

Additional information requests are at TIP's discretion and may include ...

- Site visits
- Oral reviews
- Corrections to forms
- Clarifications

Quick, timely responses to all requests are required or you jeopardize your potential for selection

Accounting Systems Certification and Compliance Audits

- **NIST may require some recipients to provide an accounting system certification**
 - Cost of certification may be included in “Other” cost category
- **Recipients must undergo periodic financial compliance audits**
 - Details will be provided as part of the award terms and conditions
 - Include audit costs in proposal budget (Kit p. 69)

Proposal budget becomes the basis for project costs

Human and Animal Subjects

- TIP can fund projects involving human and/or animal subjects in research activities
 - Must comply with applicable Federal rules
 - Not just biomedical research
 - You may be required to submit additional information
- Refer to Chapter 4 of the TIP Proposal Preparation Kit and “*Guidelines and Documentation Requirements for Research Involving Human and Animal Subjects*”
 - www.nist.gov/tip/helpful.html



Human and Animal Subjects: For More Information

- Archived webcast on the details surrounding H&A Subjects:
 - http://www.nist.gov/tip/archived_webcasts.html
- Call Human & Animal Subjects Advisor for help



Proposal Submission Process

- Paper submission or electronic submission via Grants.gov
- Paper submission
 - An original and 15 color copies required



Proposal Submission Process (cont'd)

- **Electronic submission**
 - Grants.gov
 - Chapter 5 of TIP Proposal Preparation Kit provides general instructions for submitting TIP proposals electronically
 - Begin Grants.gov registration **early!**

Avoid These Problems

- **Content Issues**
 - Failure to submit all required forms
 - Lack of complete budget information
 - Failure to generate a multi-year budget
- **Electronic Submission Issues**
 - Failure to submit on time because of delays caused by last minute bottlenecks
 - Using an incorrect DUNS number in Grants.gov
 - Grants.gov authorized agent didn't submit the proposal

- **Administrative, budget, cost-sharing, and eligibility**
 - Barbara Cuthill, 301-975-3273, barbara.cuthill@nist.gov
- **Project selection, evaluation and award criteria**
 - Thomas Wiggins, 301-975-5416, thomas.wiggins@nist.gov
- **Electronic proposal submission**
 - Chris Hunton, 301-975-5718, christopher.hunton@nist.gov
- **NIST-1022 and associated forms**
 - Deborah Dubeau, 301-975-3462, deborah.dubeau@nist.gov

- **Human and/or animal subjects**
 - Lawrence Uhteg, 301-975-8779, lawrence.uhteg@nist.gov
- **Foreign-owned company participation**
 - Kathleen McTigue, 301-975-8530, kathleen.mctigue@nist.gov
- **Grants and cooperative agreement rules and regulations**
 - Grants and Agreements Management Division, 301-975-5718, grants@nist.gov



For Info on TIP . .

- Visit TIP's website
 - *www.nist.gov/tip*
- Register for the TIP mailing list
 - *http://tipmailing.nist.gov/forms/mailling_list.cfm*
- Upcoming TIP webcasts



2009 TIP Competition

Important Dates

- The Competition is currently **OPEN**
- Paper submission or electronic submission via Grants.gov
- The **deadline** is:
 - **Tuesday, June 23, 2009**
 - All proposals must be received by TIP by 3:00 PM Eastern time (regardless of submission method) **WITHOUT EXCEPTION**

*To ensure timely receipt, don't wait to submit until
deadline day!*



Questions?